HOW AFFORDABLE A STRONG DEFENSE?

The Industrial Base Is a Key

Michael N. Beltramo

Defense is one government program that has accomplished its specified objectives. It has protected the United States from foreign aggressors and largely is responsible for the demise of our chief enemy, the former USSR. This success has brought substantial rewards including, especially, a greatly diminished strategic nuclear threat and the ability to reallocate public resources to meet other pressing needs.

Ironically, although the success achieved by our strong defense has benefited the public at large, substantial penalties have been thrust upon those responsible. They include DOD and Service civilians and members of the military, contractor employees, and investors. These penalties are unemployment and underemployment; the devaluation of real property, capital assets, and corporate value; and a diminished defense industrial base.

Few would argue against continuing to maintain a strong, if differently configured, national defense. One reality is that the future of the U.S. defense establishment will be driven more by relative budget scarcities than any other factor. Therefore, it is important to have sound bases for making cost/utility trade-offs. Cost analysis must play a major role in this process. However, since environmental conditions driving cost will be altered dramatically, tried and true analytical tools will require major revision. A brief assessment of how the defense industrial base will evolve is made before examining the task confronting the cost-analysis community.

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Factors Shaping the Defense Industrial Base

Budget scarcities will require firms to supply the defense establishment and customers within the defense establishment to adapt. Dramatic changes already are taking place within the defense industry. Consider some acquisitions and spinoffs that have occurred during the past few years as shown below:

—Hughes Aircraft Corporation acquired General Dynamics (GD) missiles and merged both operations into the Hughes Tucson plant.
—Lockheed acquired GD aircraft facilities and with them GD's share of the F-22 and remaining F-16 production.
—Martin Marietta bought GD's space business and General Electric's defense operations.
—Honeywell spun off its defense operations as Alliant Tech Systems.
—The LTV defense businesses were sold to several contractors.

These major consolidations have resulted, and will continue to result, in jettisoning of over capacity and in creating fewer but stronger competing firms.

The reality of a shrinking market has been felt within defense firms, also. For example, fewer new business opportunities and fewer firms competing for them means a dramatic reduction in engineering, technical and support personnel required for research and development and proposal preparation. Furthermore, since many of these personnel have been carried traditionally as direct support by ongoing production programs between new business opportunities, their loss will mean a change in the cost structure of many programs.

Although most large firms have responded to the necessity of downsizing, few have understood fully what must become the maxim of the future: *It is not useful to do something better if it should not be done at all.* In an article published in *CALS Journal*, Spring 1993, Paul Strassmann said that in the 1970s Xerox discovered:

> ...even with an assumption of zero manufacturing costs our delivered product cost was greater than our competitors' prices. Even a disregard of manufacturing costs would not have helped Xerox because the transaction costs for marketing, accounting, promotion, and

what some of you call bureaucracy, was greater than what the competitor was able to achieve... From this I learned the issue of productivity revolves first around the necessity to streamline business processes.

Thus, a further shakeout of the defense industry is inevitable as firms begin to reengineer themselves, rather than simply pruning deadwood.

Clearly, the potential for long-term cost savings exists within the defense industry; however, many short- to mid-term factors will mitigate against them. Personnel costs may respond eventually to a shrinking demand and decrease, but immediate costs will increase because of: higher average wages as more senior employees are retained, severance pay for laid-off workers, higher unemployment taxes, and relocation expenses for transferred employees. Facilities and other capital costs for underutilized assets may remain until leases have expired or amortization is complete. Environmental cleanup costs may become a more important cost element in the future as defense sites are converted to other uses.

Severe Budget Reductions Not Scalable

Apparently, the long-term impact of declining budgets is not fully appreciated within DOD and the Services. Severe budget reductions are not scalable. Specifically, the proportion of the defense budget required for operations and support will grow dramatically as fewer replacement systems are purchased and retrofits and upgrades become more prominent. This, in turn, will force wrenching decisions about program cancellations and production slowdowns.

"Saving" some programs will escalate the costs of others dramatically as reduced business bases will increase overhead costs, and lower production rates will increase direct costs.

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Combined, these factors will cause the unit costs of defense matériel to increase dramatically. Thus, just as contractors must reengineer their operations to survive, DOD must reengineer theirs to defend our nation.

Reengineering within DOD must be comprehensive and driven by astute and aggressive management because there are no market forces to propel it. The first step must be to address openly the government's enduring fiction that it does not have an industrial policy. Obviously, having voluminous regulations prescribing how items are to be purchased, manufactured, tested, inspected, documented and delivered; underwriting the proposal and research and development (R&D) expenses of existing suppliers; determining tax liabilities; and providing plant and capital assets (e.g., GOCO) constitutes an industrial policy. This policy is manifest in that virtually no large prime contractor has combined its commercial and defense operations.

The DOD must now confront future realities: most technical innovation will come from commercial enterprises; buying practices must be altered greatly to eliminate nonvalue added procedures; we can no longer afford the luxury of an unnecessarily large base of weapon-system platform manufacturers. The implications of these issues are profound.

If future innovations from commercial enterprises are to be applied to defense projects, there must be a way to give these businesses an incentive to participate on defense projects. Instead, independent research and development and bid and proposal allowances for suppliers act as a barrier by subsidizing their participation while requiring newcomers to invest their own capital. This must change for at least some sectors of the defense market.

As commercial procurement and foreign cooperation become more prevalent in multiplying and exploiting research and development expenditures, burdensome procurement regulations, the primary outcome of which has been the creation of large government and contractor bureaucracies, will become unacceptable. Additionally, it has become obvious that the government is unable to adapt and deal with nontraditional (i.e., neither completely off-the-shelf nor developmental) items.

A recent joint-Service program showed government's inability to define a procurement strategy that would provide an appropriate testing level for a manufacturing development item. Specifically, there was a quandary over whether it should be treated as an off-the-shelf buy or as a new development program. The correct answer was in between; but, by following CYA guidelines it was treated as a new development, which substantially increased cost.

Several contractors for each type of weapon system platform have been established by spreading contracts based upon which firms had slowed production on existing programs. This has been supported by studies and refuted by government authorities. However, we no longer can afford the luxury of excess plant capacity and redundant engineering talent when new future programs will be sparse. Thus, an assessment of the costs and benefits of funding so many redundant capabilities is necessary. The flip side is ensuring adequate support of critical defense needs.

Either the defense establishment must enter a new era of efficiency and management in a time of scarcity, or our national security will be seriously compromised. However, making sound decisions to achieve a strong national defense during a period of severe budget constraints will require credible estimates of the costs of alternative policies and strategies.

What Cost Analysts Must Do

Parametric methods have been the cornerstone of cost analysis since its inception. They support the estimation of future systems or functions by finding correlation among various factors and costs. Such factors usually have included measures for technology, physical dimensions and production size.

Using parametric methods (supplementing them occasionally with analogies, engineering buildups, and expert judgment, as required) cost analysts have served their clients well. In the future, cost analysts will be seriously challenged by changes in the composition of the data upon which they rely as their estimates bases. In addition, their clients will include more senior managers.

Important to remember is that implicit assumption about data used to derive cost-estimating relationships procedures for producing a product or performing a task are either consistent over time or evolving in a way that is parallel to technological change. In other words, consistency in procedures, methods and organization has allowed cost analysts to ignore them when making estimates. But, if an organization realizes, as Xerox did years ago, that it must radically change many facets of its operation, organization, procedures and methods, much previous data will become misleading as the bases for estimates.

Thus, cost analysts must make a greater effort to determine and understand the detailed content of their data. By doing so, they will be able to make necessary heuristic adjustments. The attention to detail necessary to arrive at reliable and valid cost estimates is exemplified by problems encountered when attempting to assess the effect of varied production rates on cost.

Assessing the effect of production rate changes on cost has long been a perplexing problem for cost analysts. Few doubt that increasing production up to the planned rate would lower unit cost. This is because available capital and labor (direct and indirect) would be utilized fully. Similarly, producing at a lower rate than planned would hinder efficiency, thereby increasing cost.* However, numerous studies have failed to demonstrate this effect convincingly, since only gross measures have been considered. Such measures are subject to many offsetting distortions, and discerning important factors within them is tantamount to "unscrambling the eggs."

For example, quantity acts as a proxy variable for rate effects as well as the multitude of other factors that drive cost. In particular, rate is a function of plant capacity and output. Most rate effects are spread across all products in a plant during a given time period. Thus, a decrease in production rate for one item produced in a process-oriented plant may be compensated for by an increase for another with no decline in efficiency (i.e., increase in cost). Cost analysts must think about the "bigger picture" at a lower level of detail for many other issues as well to develop useful future estimates. Several variables in addition to the traditional weight, quantity and cost must be considered when making estimates.

It is unlikely that cost analysts can incorporate the additional considerations at their leisure as top management (government and contractor) must base critical decisions on assessment of their cost implications. At an ISPA Workshop in Los Angeles, Calif., during February 1993, about 50 cost analysts who worked for defense firms were asked if they provided their senior managers with:

—Estimates of the effects of budget reductions on direct and/or indirect costs
—Analysis of cost implications of alternative business strategies (e.g., acquisitions, mergers, consolidations)
—Estimates of a competitor's cost or price.

Fewer than 10 percent answered affirmatively to any of these, which indicates the inadequate job cost analysts, as a group, have done to expand their turf and market their capabilities. That must change in an environment driven by budget scarcity.

Conclusion

More wrenching changes are in store for the defense community. Either new policies will be established enabling us to accomplish more for less by reengineering a bloated and inefficient establishment, or national security will suffer. If effective changes are to be made, they must be guided by sound cost analyses.

*Higher-than-planned rates would increase cost also, but rarely has this been a problem because of overly optimistic defense planning.

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